Image Capture Framework

204

Image Capture Framework

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Image Capture Framework

- Image Capture Overview
- How to use Image Capture with your application
- Scanner Support
- TWAIN
- New in Panther

What Is Image Capture?

- Image Capture Framework is a technology for working with image capture devices
  - Image Capture defines driver architecture for imaging devices
  - Image Capture API abstracts the device specifics from applications

Image Capture Framework

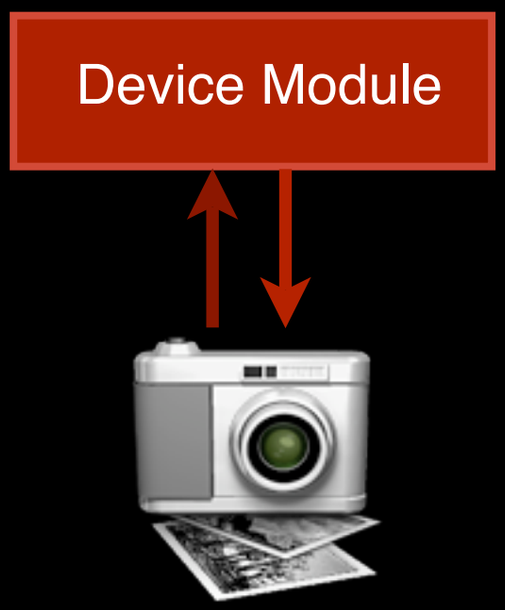


Image Capture Framework

PTP
MassStorage
Type1Camera
Type2Camera
Type3Camera
Type4Camera
Type5Camera
Type6Camera
Type7Camera
Type8Camera

TWAINBridge
Type1Scanner

Image Capture Framework

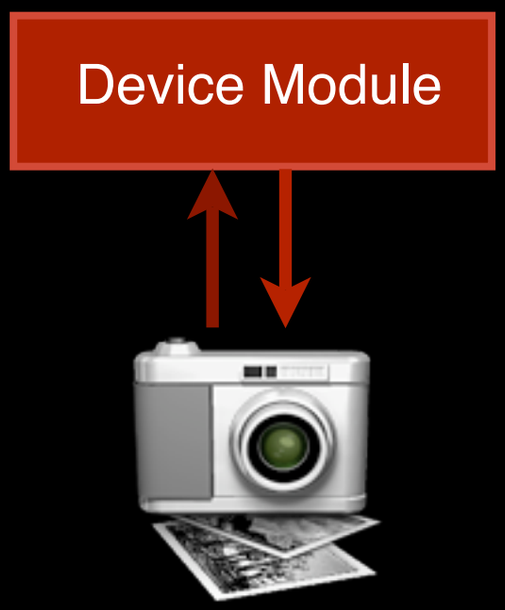


Image Capture Framework

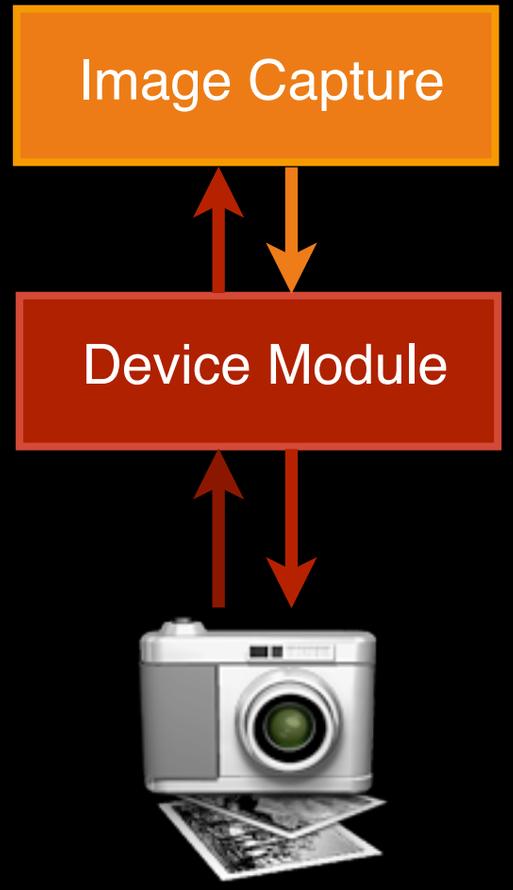
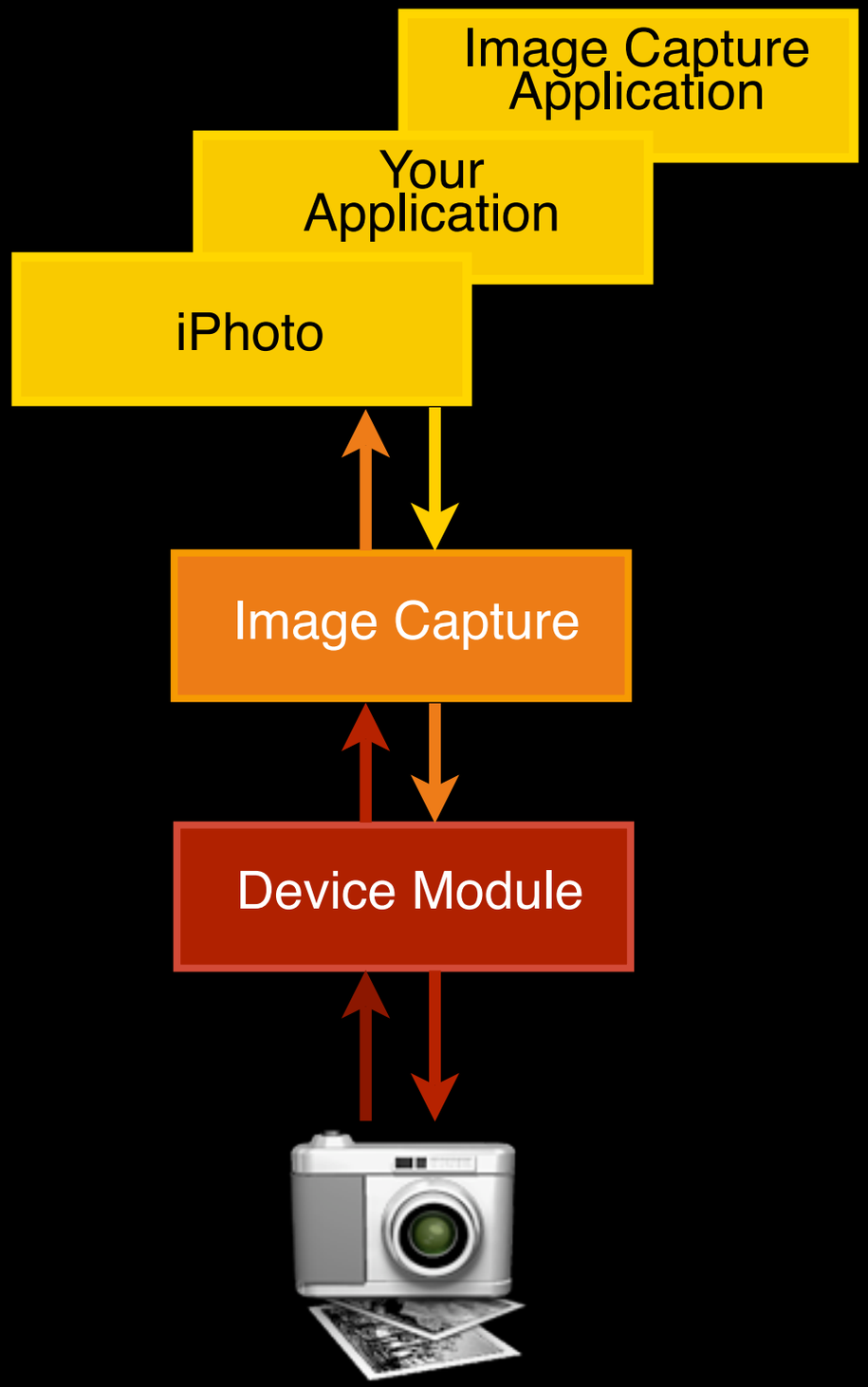
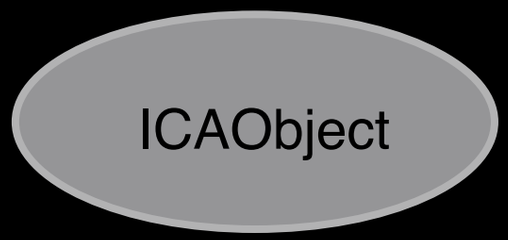


Image Capture Framework



Objects, Properties, and Dictionaries

- Objects
  - Type and subtype as identifiers
  - May contain other objects
  - Contain properties
  - Contain a property-dictionary



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Objects, Properties, and Dictionaries

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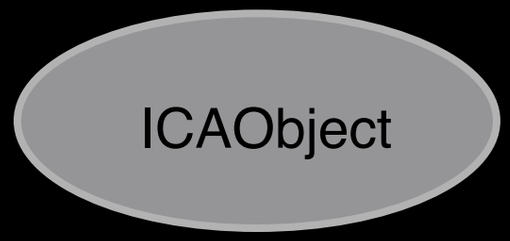
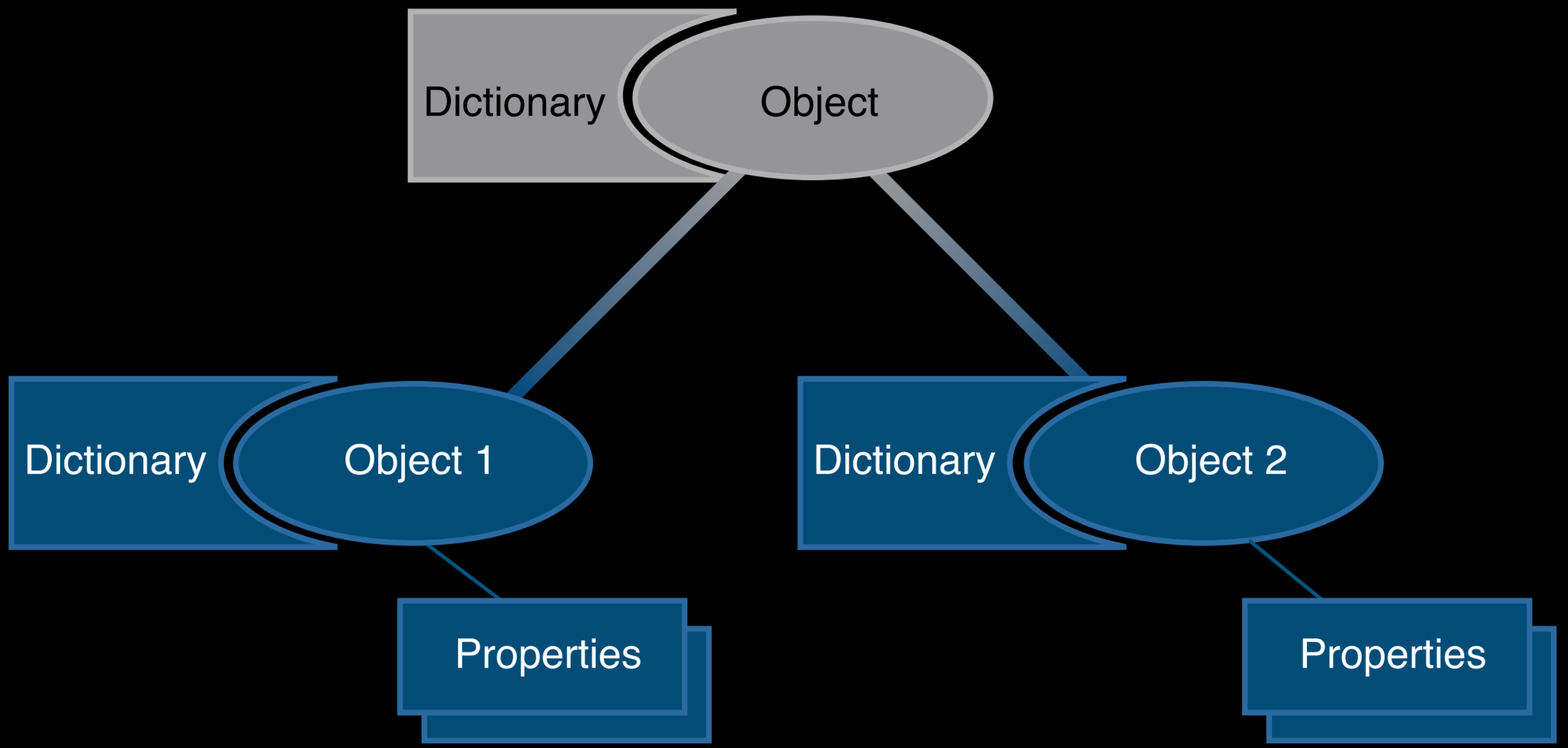
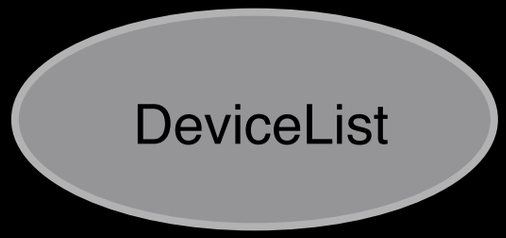
  - May contain other objects
  - Contain properties
  - Contain a property-dictionary
- Properties
  - Type and subtype as identifiers
  - Contain the ‘real’ data (item data and thumbnails)
- Dictionaries
  - Contain item information
  - Contain all meta-data



Objects, Properties, and Dictionaries

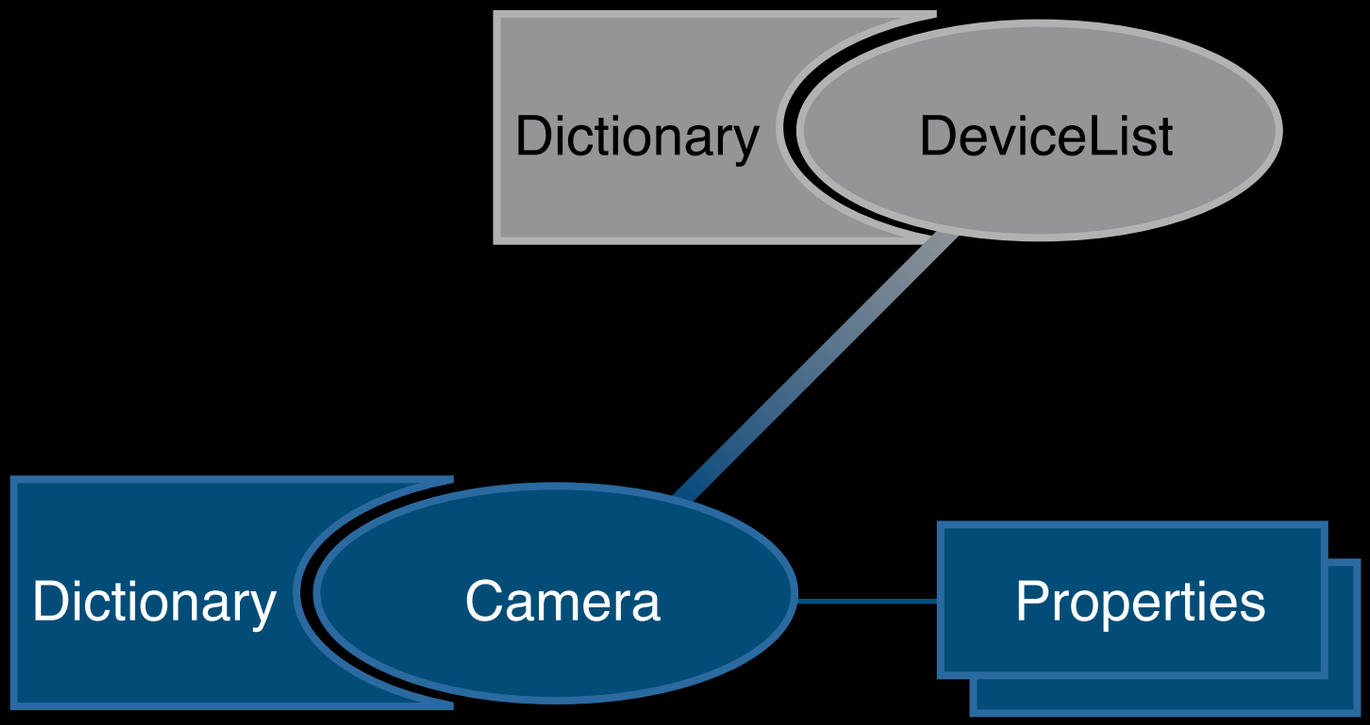


Objects, Properties, and Dictionaries

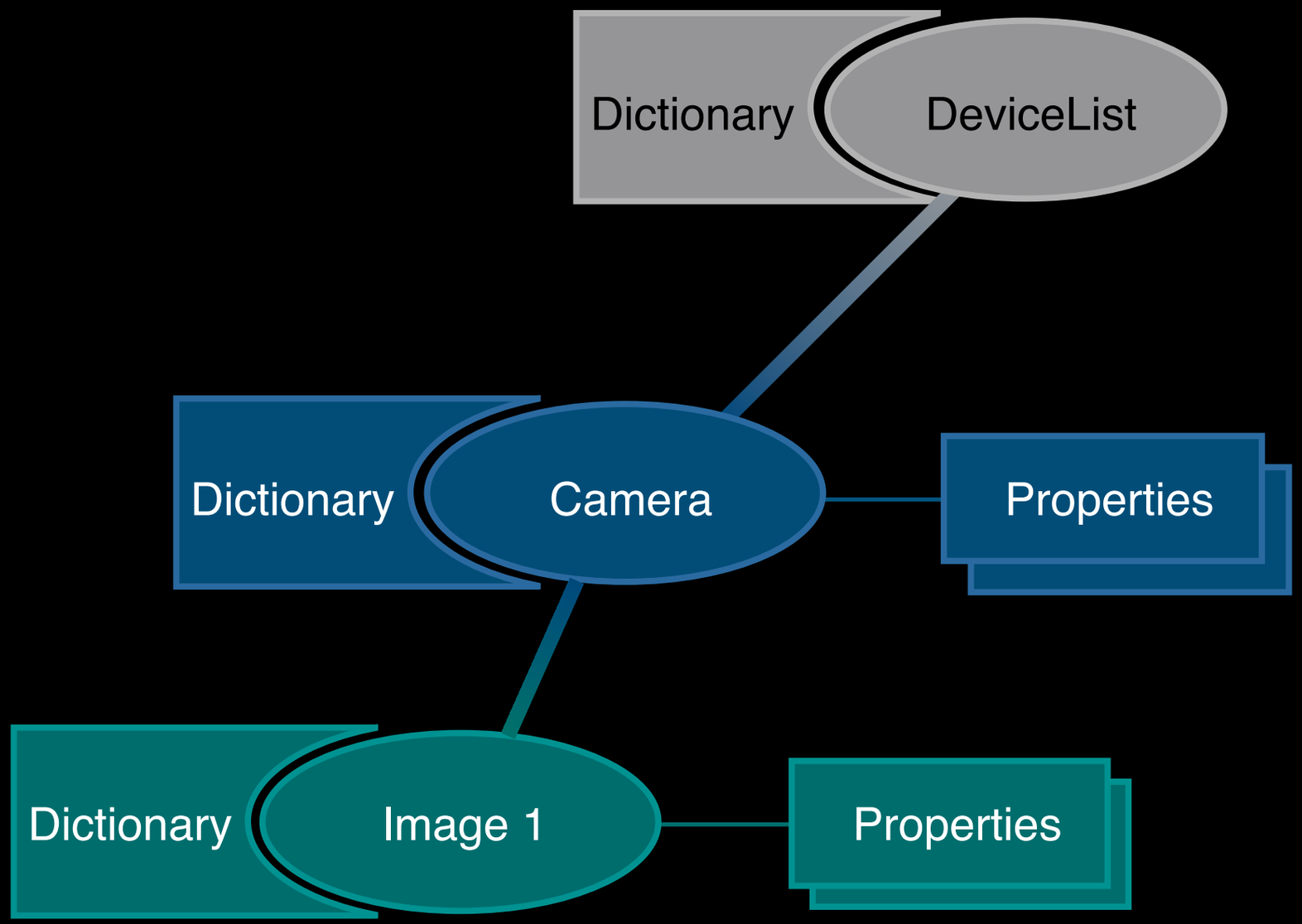


Objects, Properties, and Dictionaries

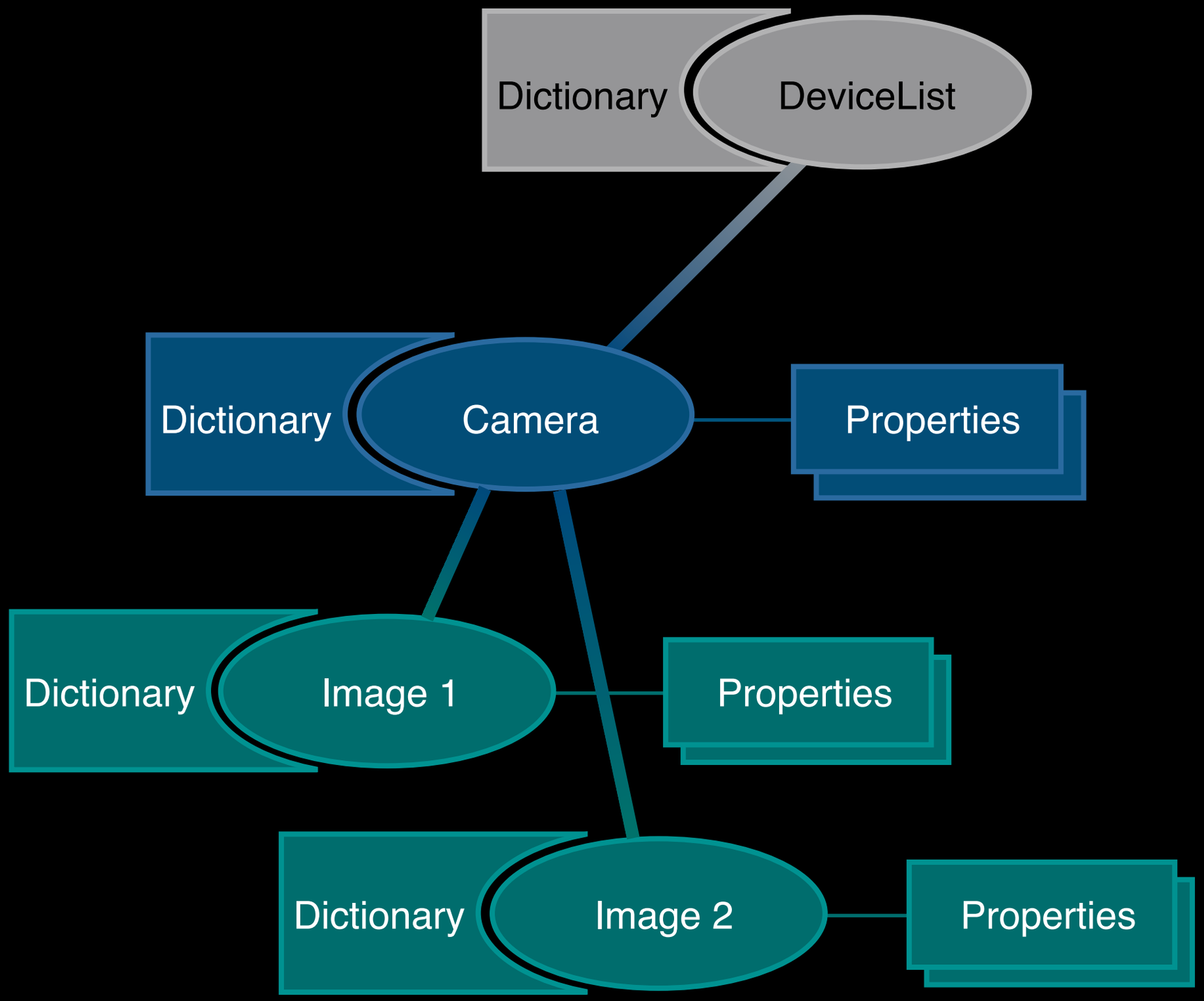
Objects, Properties, and Dictionaries



Objects, Properties, and Dictionaries



Objects, Properties, and Dictionaries



Demo

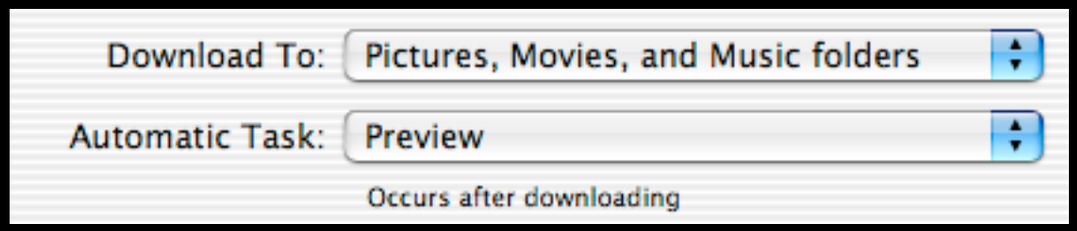
How to Use Image Capture With Your Application

How to Use Image Capture With Your Application

Automatic Task

Automatic Tasks

- In the Image Capture application UI, your application can be set as an automatic task
- Needs to support ‘open document’ events
- After downloading, your application gets called with the downloaded files



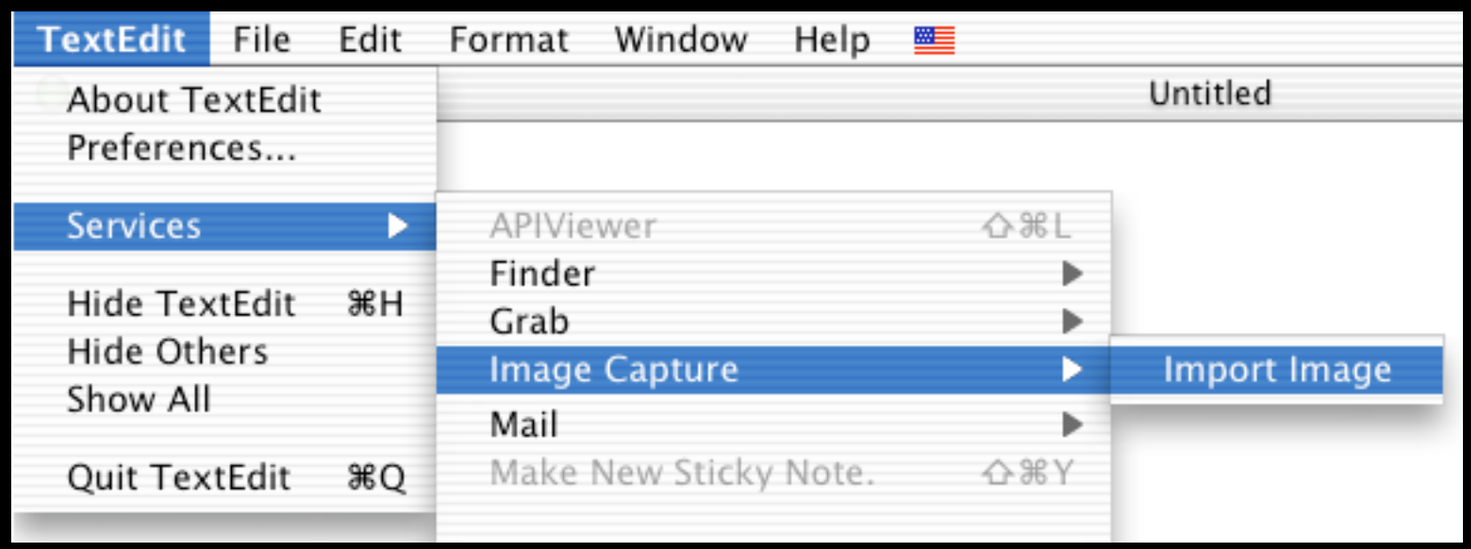
How to Use Image Capture With Your Application

Automatic Task

Services

Services

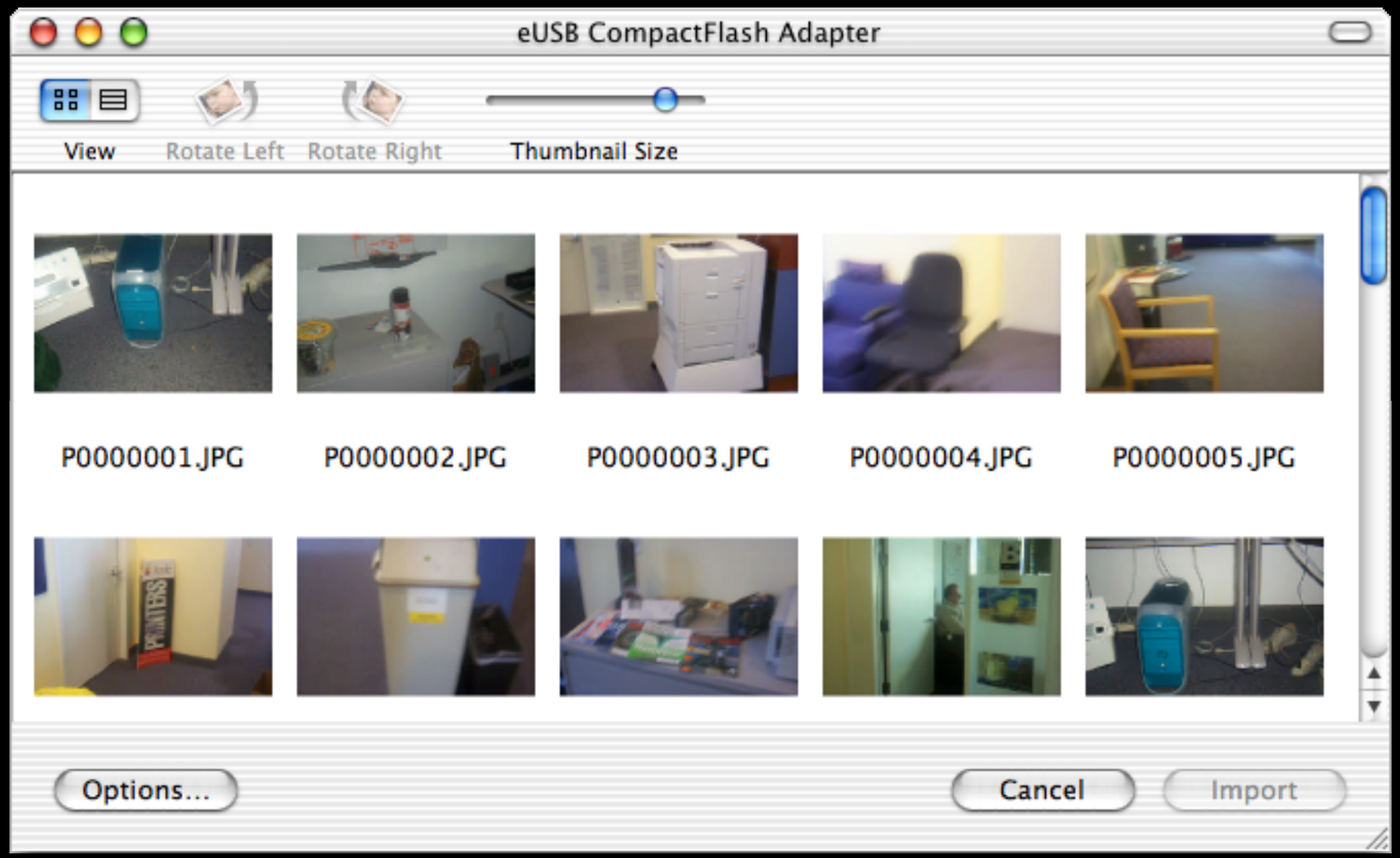
- Your application should support ‘services’:
  - Cocoa: handled by the framework
  - Carbon: support the required AppleEvents
    - http://developer.apple.com/techpubs/macosx/Carbon/HumanInterfaceToolbox/MenuManager/appservices/intro/index.html



How to Use Image Capture With Your Application

- Automatic Task
- Services
- Common UI

Common UI


eUSB CompactFlash Adapter
View
Rotate Left
Rotate Right
Thumbnail Size
P0000001.JPG
P0000002.JPG
P0000003.JPG
P0000004.JPG
P0000005.JPG
Options...
Cancel
Import

Common UI

- Use the new Image Capture API

```
OSErr ICAImportImage (ICAImportImagePB * pb,
                      ICAComletion completion);
```

to bring up a common camera or scanner UI

How to Use Image Capture With Your Application

- Automatic Task
- Services
- Common UI
- Custom UI

Custom UI

- Full control

Custom UI

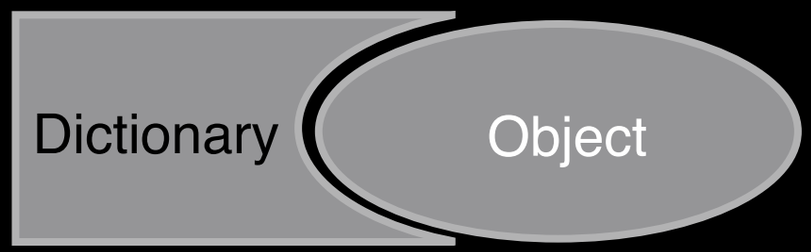
- Full control
- Here are three important APIs:
  - `ICAGetDeviceList`
  - `ICACopyObjectPropertyDictionary`
  - `ICADownloadFile`

ICAGetDeviceList

- Image Capture API to get access to the ICAObject at the root of the object tree

ICACopyObjectPropertyDictionary

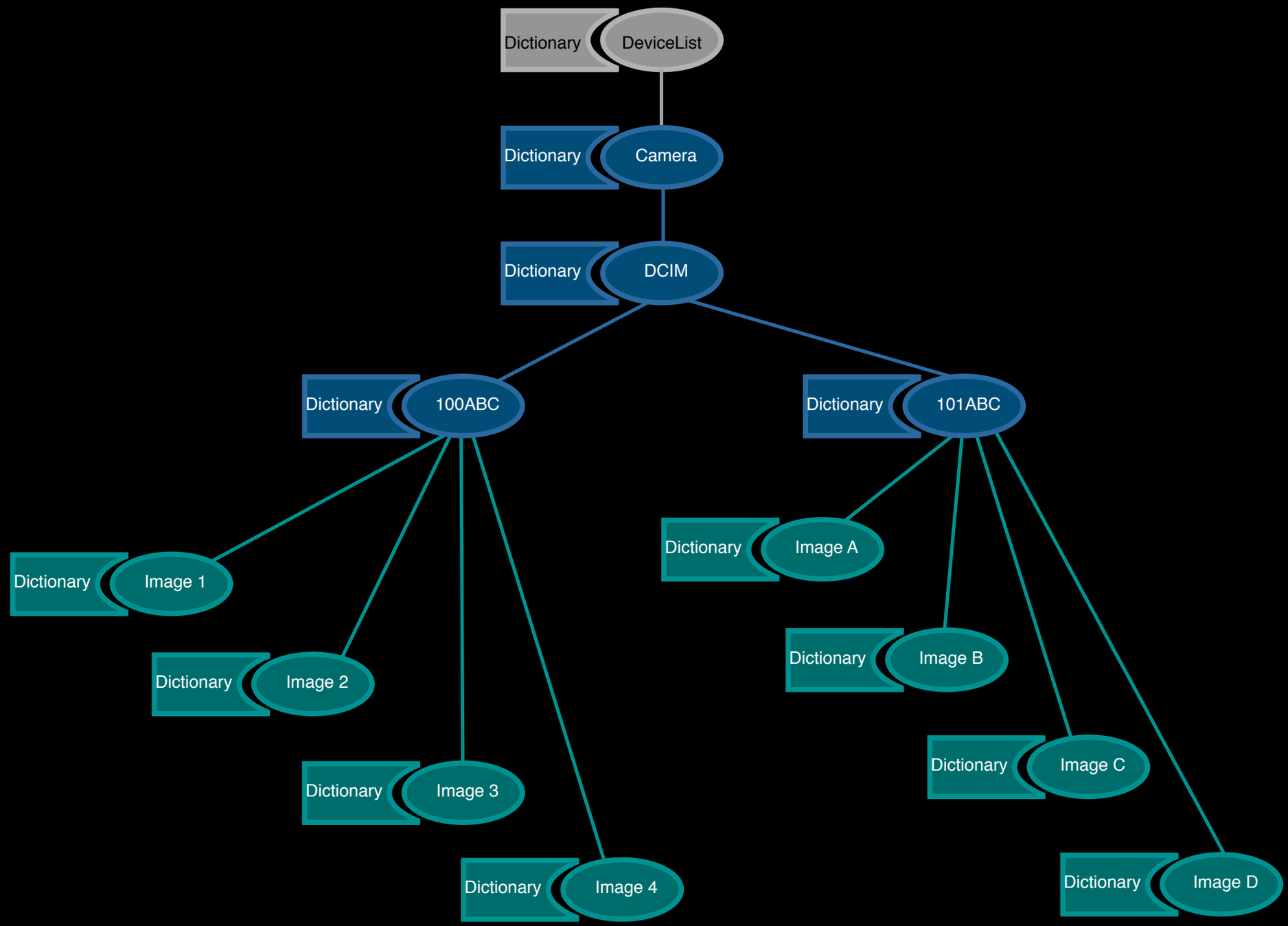
- Returns object information in a CFDictionaryRef / NSDictionary



ICACopyObjectPropertyDictionary

```
ColorSync profile = sRGB;
Product Name = eUSB CompactFlash Adapter;
Vendor Name = SCM Microsystems Inc.;
capa = {
    'del1';
    'ejec';
}
data = {
    {
        datP = 0x0016A670;
        file = 'imag';
        icao = 0x001678F0;
        ifil = P0000001.JPG;
        isiz = 346261;
        lock = 0;
        thuP = 0x0016A700;
        tsiz = 65549;
    }
...
```

ICACopyObjectPropertyDictionary



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    }
...
```

ICADownloadFile

- Image Capture API to download files
- Handles post-processing:
  - Embeds ColorSync profiles
  - Adjusts creation date
  - Creates custom icon
  - Rotates images
  - …

Demo

Scanner Support

Scanner Support

- Simple UI

Scanner Support

- Simple UI

- Image Capture supports
  - Image Capture ‘native’ scanner modules
  - TWAIN Data Sources

Scanner Support

- Scanner related Image Capture APIs
  - `ICAScannerOpenSession`
  - `ICAScannerCloseSession`
  - `ICAScannerInitialize`
  - `ICAScannerGetStatus`
  - `ICAScannerGetParameters`
  - `ICAScannerSetParamerters`
  - `ICAScannerStart`

ICAScannerGetParameters
ICAScannerSetParameters

- Pass all parameters in a CFDictionaryRef
- For Panther:
  - New keys—closer to TWAIN APIs
  - Support for flatbed and transparency units

TWAIN

TWAIN

- Established industry wide standard to access imaging devices

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- Three key components
  - Client application
  - Data Source Manager (DSM)
  - Data Sources (DS)

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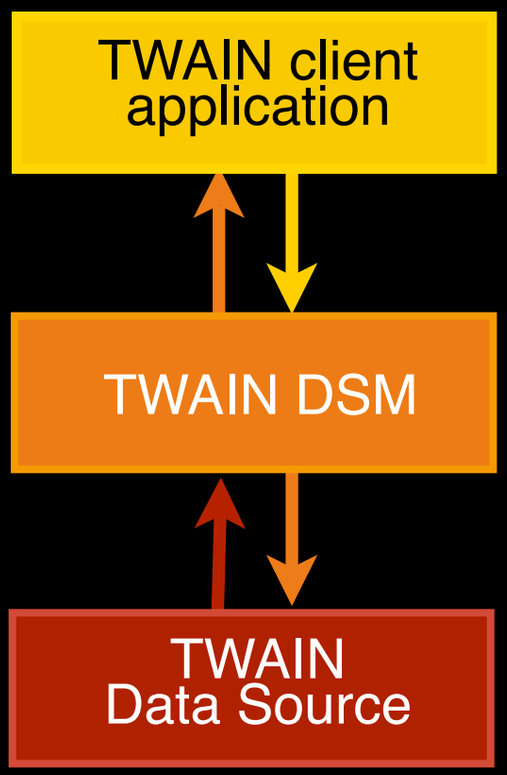
- DSM is installed with Mac OS X
-

Do not install any TWAIN DSM

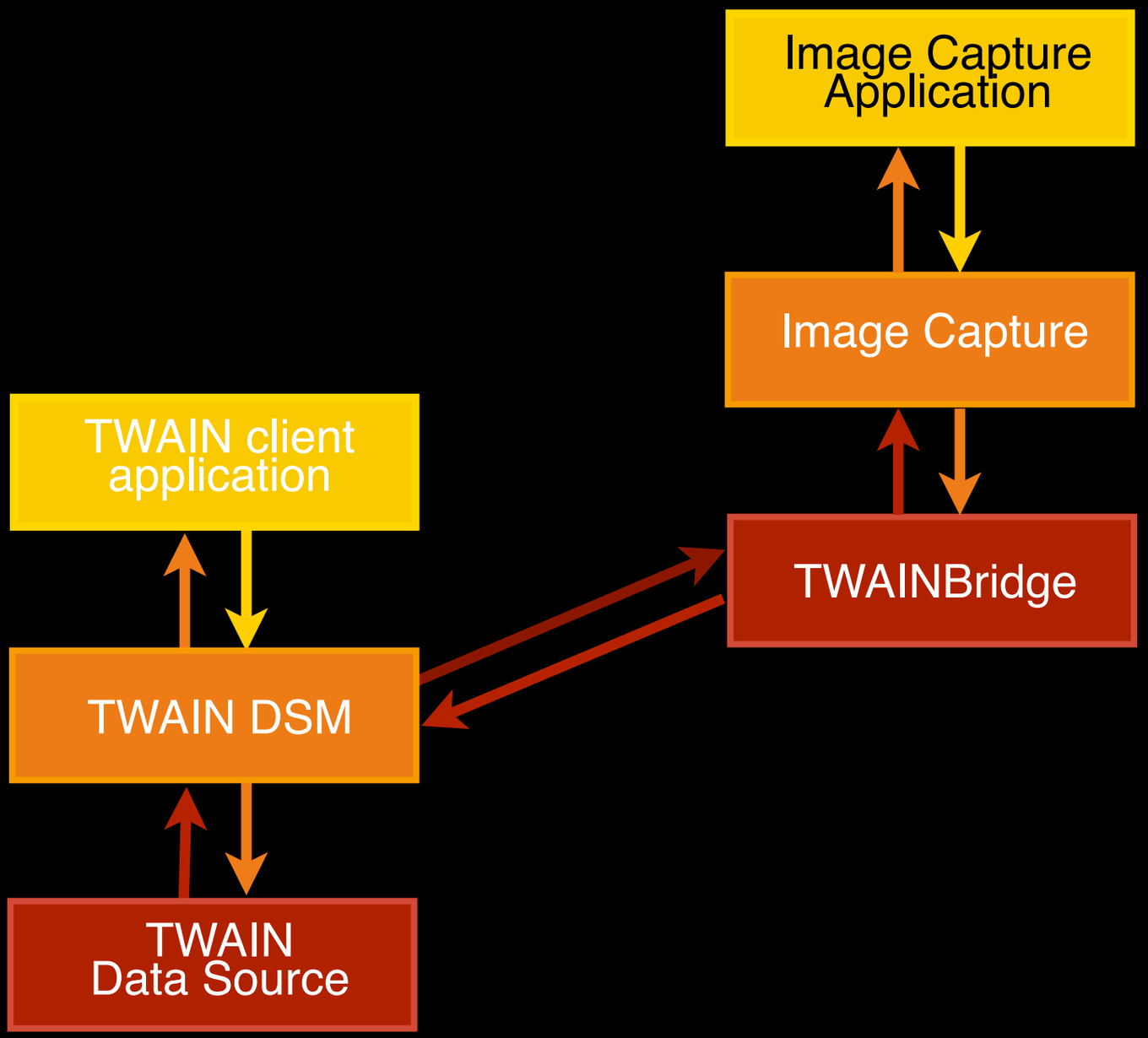
TWAIN



TWAIN—and Image Capture

- TWAINBridge
  - Image Capture device module that talks to a TWAIN DS
  - Provides a way to monitor device buttons and triggers the correct actions
  - Gets launched when a device is connected

TWAIN—and Image Capture



TWAIN—and Image Capture

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For the DS:

- New binary format—bundles
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For the TWAIN client:

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For the DS:

- New binary format—bundles
- New event model
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For the TWAIN client:

- New event model

New Apple Tech Note TN2088: ‘TWAIN for Mac OS X’

New In Panther

New In Panther

- Image Capture enhancements
- Image Capture Networking
- Image Capture Web Server
- New APIs

Image Capture Enhancements

- Property-dictionary for DeviceList

Image Capture Enhancements

- Property-dictionary for DeviceList
- Enhanced UI
  - Faster launching
  - Better session handling
  - Scanner image enhancements
  - Progressive scan

Image Capture Enhancements

- Property-dictionary for DeviceList
- Enhanced UI
  - Faster launching
  - Better session handling
  - Scanner image enhancements
  - Progressive scan
- TWAINBridge uses memory-based transfer instead of native transfer (PICT)

Demo

Image Capture Networking

- Allows you to share a camera or scanner

Image Capture Networking

- Allows you to share a camera or scanner
- Works with existing device modules
- Works with existing client applications
- No new APIs

Image Capture Networking

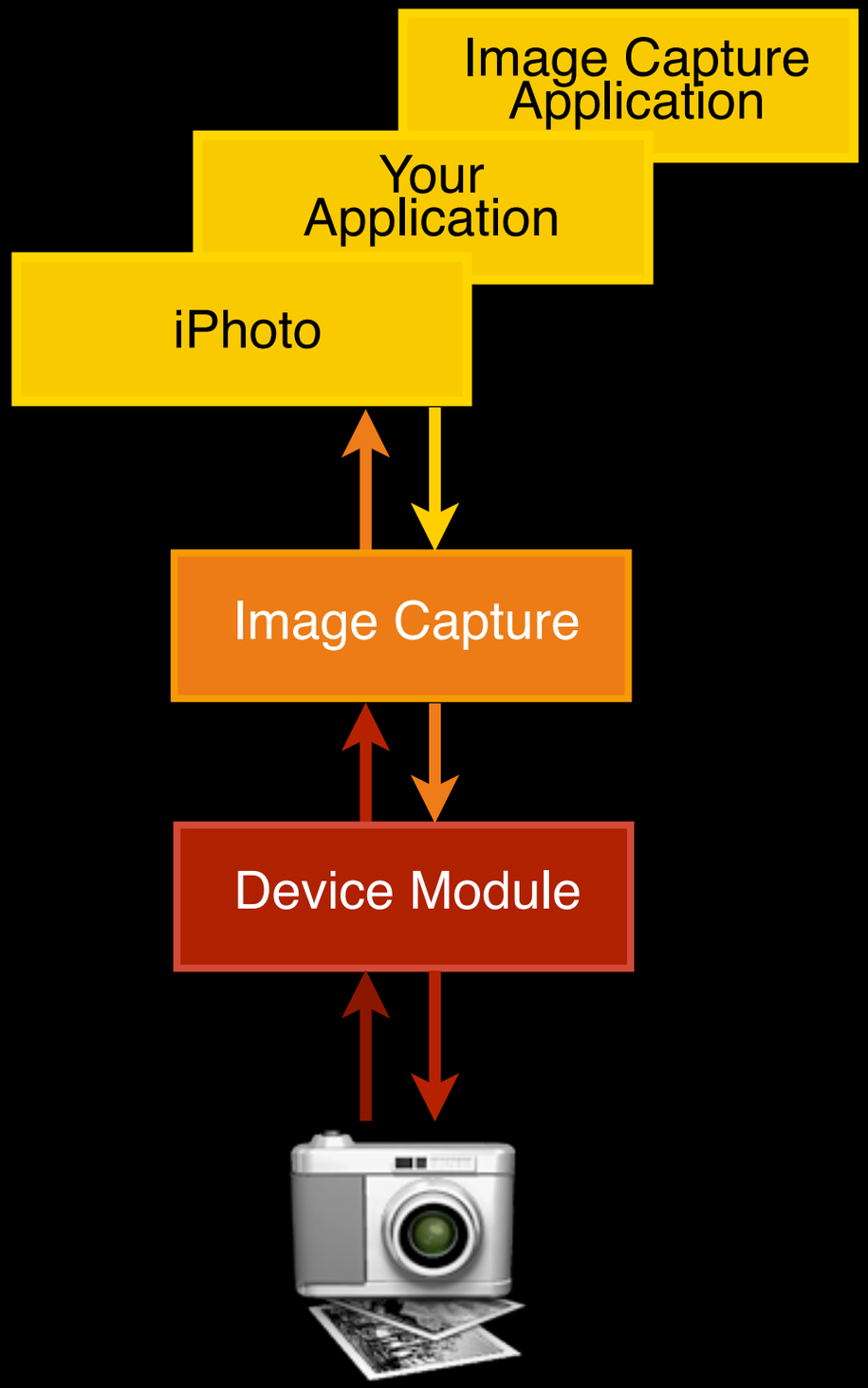
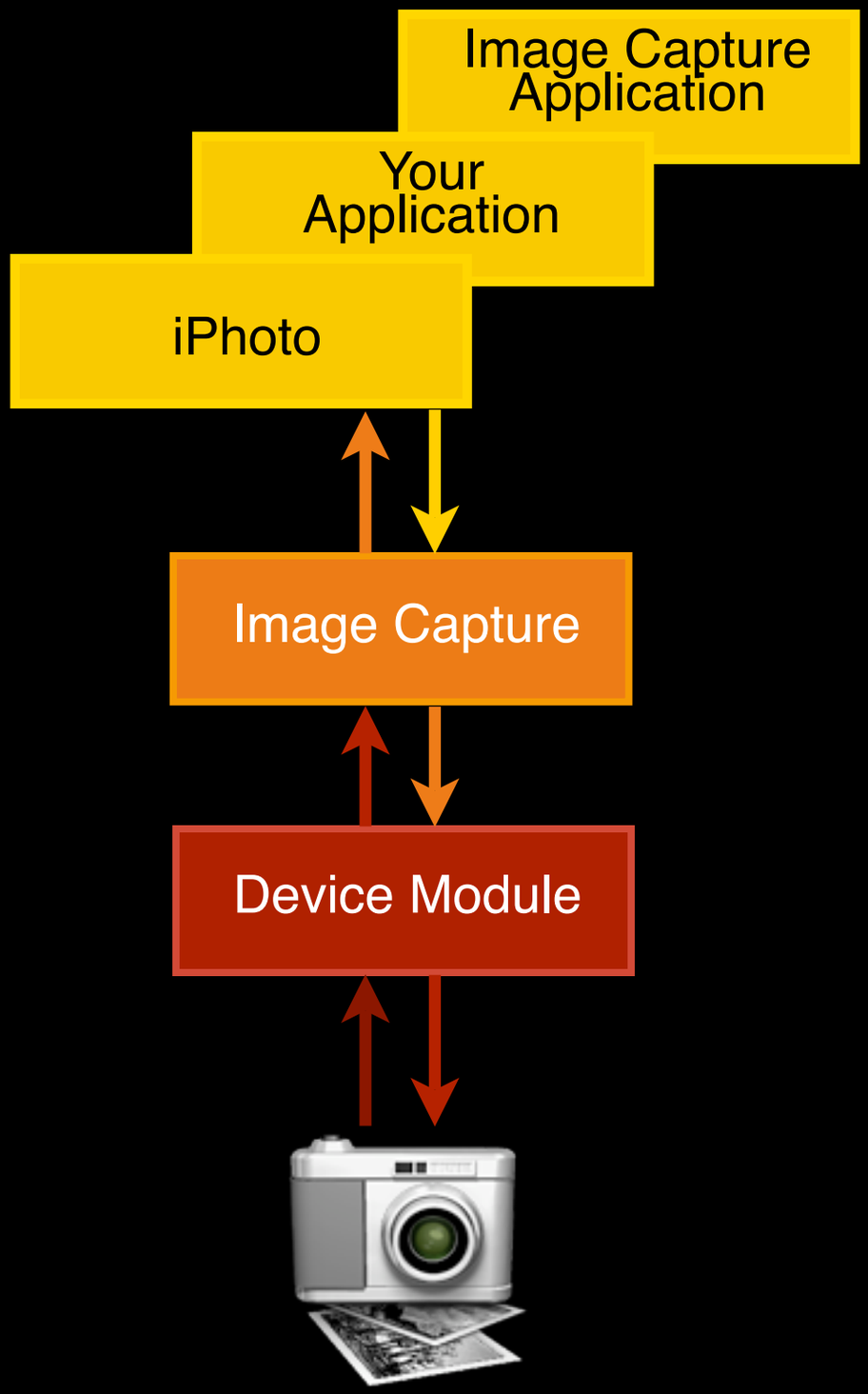


Image Capture Networking



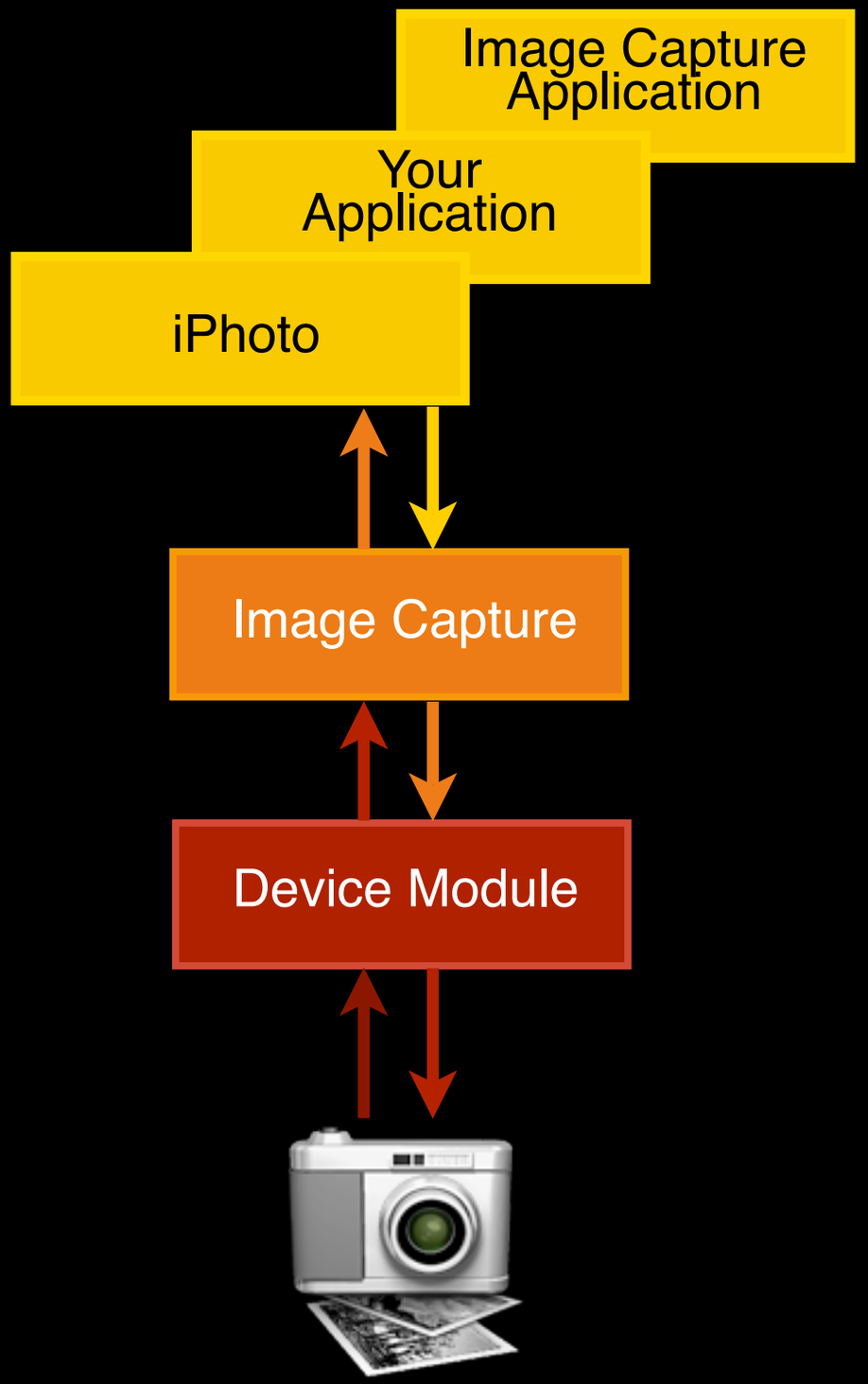


Image Capture Networking

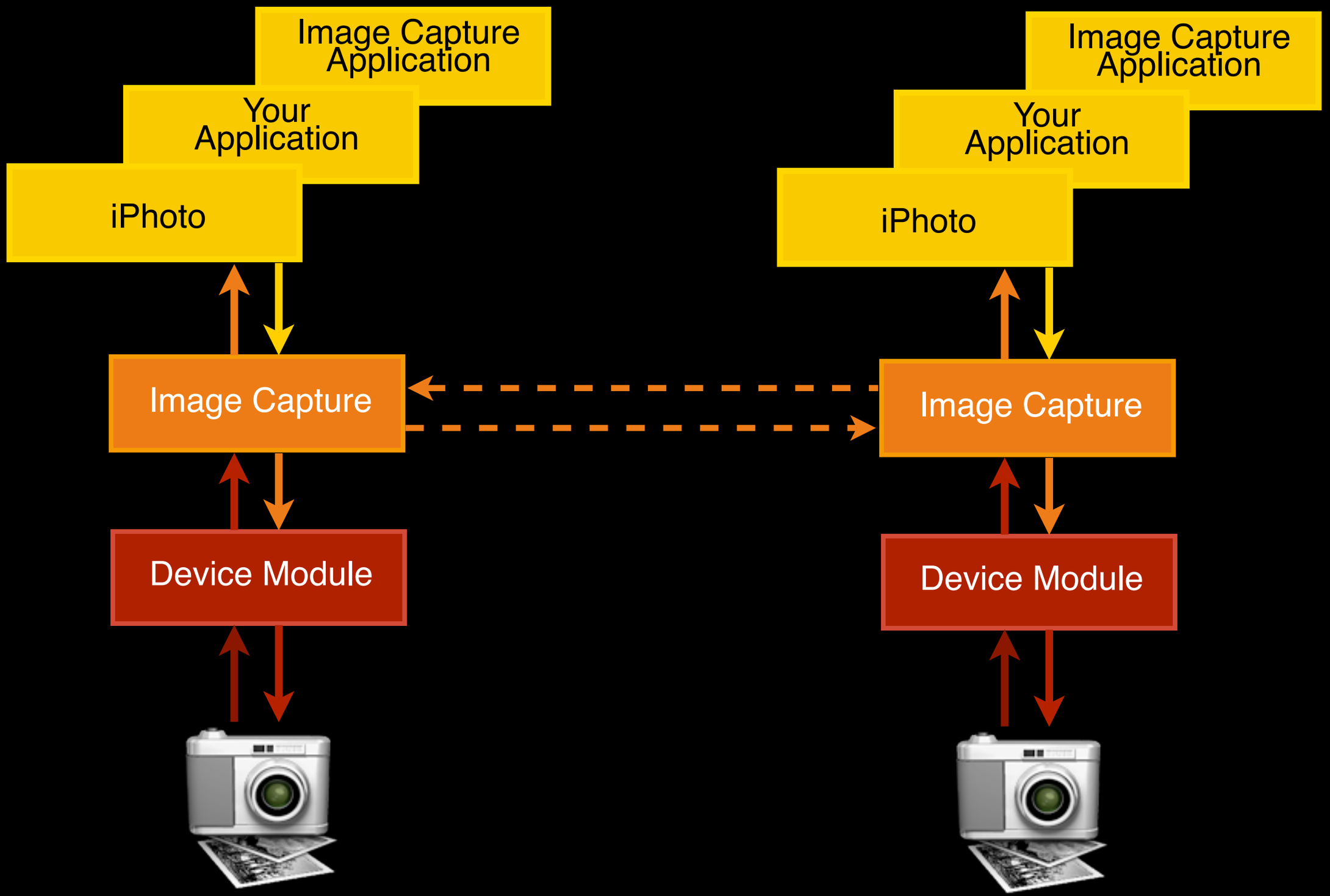


Image Capture Web Server

- Allows you to share a camera over the internet

Image Capture Web Server

- Allows you to share a camera over the internet
- Works with existing device modules
- Works with all internet browsers

Image Capture Web Server

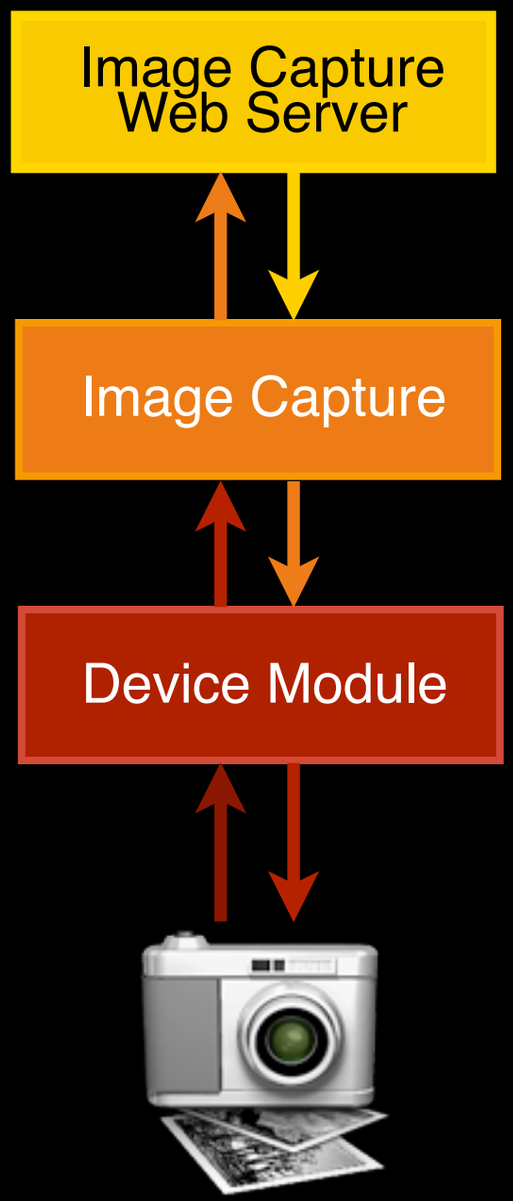
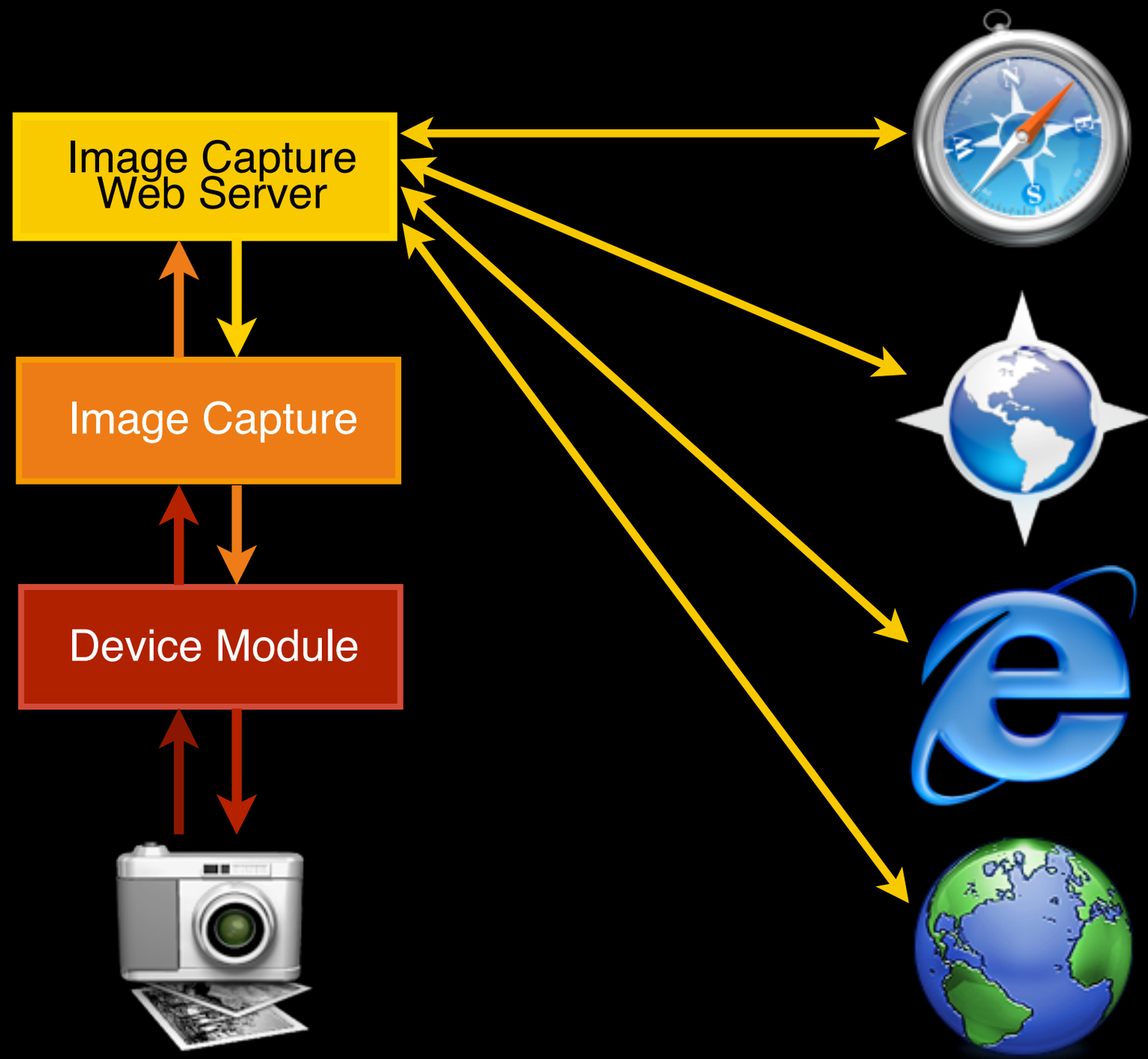


Image Capture Web Server



Demo

New In Panther

New APIs

New APIs

- Common UI—`ICAImportImage`

Common UI—ICAImportImage

- Easy way to add Image Capture support to your application
- Single API allows you to access images from cameras and scanners

Common UI—ICAImportImage

```
OSErr
ICAImportImage( ICAImportImagePB* pb,
                ICACompletion     completion);
```

Common UI—ICAImportImage

```
struct ICAImportImagePB
{
    ICAHeader               header;
    ICAObject               deviceObject;
    UInt32                  flags;
    CFArrayRef              supportedFileTypes;
    ICAImportFilterProc     filterProc;
    CFArrayRef*             importedImages;
};
typedef struct ICAImportImagePB ICAImportImagePB;
```

Common UI—Extending TextEdit

```
// in Document.m

- (IBAction)icaImportImage:(id)sender
{
    OSErr             err;
    ICAImportImagePB  pb = {};

    pb.header.refcon       = (UInt32)self;
    pb.deviceObject        = 0;
    pb.flags               = 0;
    pb.filterProc          = myFilterProc;
    pb.supportedFileTypes = (CFArrayRef)[NSArray arrayWithObjects:
                                        @"tif", @"jpg", NULL];

    err = ICAImportImage(&pb, importCallback);
}
```

Common UI—Extending TextEdit

```
// in Document.m

Boolean myFilterProc(CFDictionaryRef imageInfo,
                     UInt32 refcon)
{
    NSDictionary * dict = imageInfo;
    if ([[dict objectForKey: @"isiz"] unsignedLongValue] > 102400)
    {
        // skipping files that are greater than 100k
        return false;
    }
    return true;
}
```

Common UI—Extending TextEdit

```
void importCallback(ICAHeader * header)
{
    Document *    doc = (Document *)header->refcon;
    [doc icaImportCallback: (ICAImportImagePB*)header];
}

- (void)icaImportCallback: (ICAImportImagePB*)pb
{
    if (noErr == pb->header.err) &&  (pb->importedImages)
    {
        NSArray * array = (NSArray *)*(pb->importedImages);
        if (array && [array count])
        {
            NSData*         imageData = [array objectAtIndex: 0];
            NSPasteboard * pboard = [NSPasteboard generalPasteboard];
            NSArray *      types = [NSArray arrayWithObject: NSTIFFPboardType];

            [pboard declareTypes: types
                           owner: nil];
            [pboard setData: imageData
                    forType: NSTIFFPboardType];
            [[self firstTextView] paste: self];
            [array release];
        }
    }
}
```

New APIs

- Common UI—`ICAImportImage`
- Getting thumbnails—`ICACopyObjectThumbnail`

ICACopyObjectThumbnail

- Convenient way to get the thumbnail of an ICAObject
- Multiple formats (ICAThumbnail, JPEG, and TIFF)
- Returns thumbnail data with embedded ColorSync profile

ICACopyObjectThumbnail

```
OSErr
ICACopyObjectThumbnail( ICACopyObjectThumbnailPB* pb,
                        ICACompletion     completion);
```

Common UI—ICAImportImage

```
struct ICACopyObjectThumbnailPB
{
    ICAHeader               header;
    ICAObject               object;
    UInt32                  thumbnailFormat;
    CFDataRef*              thumbnailData;
};
typedef struct ICACopyObjectThumbnailPB
ICACopyObjectThumbnailPB;
```

New APIs

- Common UI—`ICAImportImage`
- Getting thumbnails—`ICACopyObjectThumbnail`
- *Accessing a device*—`kICAMessageDeviceYield`

kICAMessageDeviceYield

- New way to gain access to a device in a ‘cooperative’ way
- Use ICAObjectSendMessage and send a kICAMessageDeviceYield message to the device
- Allows developers to use a device in a non-Image Capture environment

kICAMessageDeviceYield

- New way to gain access to a device in a ‘cooperative’ way
- Use ICAObjectSendMessage and send a kICAMessageDeviceYield message to the device
- Allows developers to use a device in a non-Image Capture environment

Do not just reset the bus…

kICAMessageDeviceYield

```
OSErr  err;
ICAObjectSendMessagePB  pb = {};

pb.object = deviceObject;
pb.message.messageType = kICAMessageDeviceYield;

err = ICAObjectSendMessage(&pb, NULL);
```

Who to Contact

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johnz@apple.com

http://developer.apple.com/wwdc2003/urls.html

Q&A

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WWDC 2003

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